

COOK INLET MANAGEMENT AREA 1996-1997 SHELLFISH REPORT TO THE ALASKA BOARD OF FISHERIES



by

Charlie Trowbridge

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Alaska Department of Fish and Game
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INTRODUCTION

The Cook Inlet Management Area, Statistical Area H, is bounded on the east by the longitude of Cape Fairfield (148° 50' W. long.) and on the south by the latitude of Cape Douglas (58° 52' N. lat.). The management area is divided into six shellfish districts: Southern, Kamishak, Barren Islands, Outer, Eastern, and Central (Figure 1).

A discrete area, Outer Cook Inlet (Statistical Area G), has been established specifically for the trawl and pot shrimp fisheries in the Outer and Eastern Districts (Figure 2). Area G has its eastern boundary at the longitude of Cape Fairfield and western boundary at a line drawn from the westernmost tip of Point Adam to the westernmost tip of Cape Elizabeth and south along 151° 53' W. longitude.

This report covers the most recent shellfish fisheries in Cook Inlet: 1996 weathervane scallops (*Patinopecten caurinus*), 1996 hardshell clams, 1996 blue mussels (*Mytilus edulis*), 1996-97 sea cucumbers (*Parasitichopus californicus*), 1996 octopus (*Octopus dofleini*), and 1996 razor clams (*Siliqua patula*). The 1996-97 seasons for Area H trawl and pot shrimp fisheries were closed due to low stock abundance. The 1996-97 green urchin (*Strongylocentrotus droebachiensis*) was open, but no one made any landings. The catch data from the 1996 Dungeness crab (*Cancer magister*) and 1996-97 Area G pot and trawl shrimp fisheries are confidential. This is due to a department policy making catch information confidential when the catch is taken by two or less fishermen. A summary of the historic fisheries is given in this report. Emergency orders affecting these fisheries are listed on Table 1.

Shellfish landings from the Cook Inlet Management Area (H) included 28,228 lb of weathervane scallops, 53,757 lb of hardshell clams, 2,450 lb of blue mussels, 1,528 lb of sea cucumbers, 2,215 lb of octopus, and 355,448 lb of razor clams. Area G pot and trawl shrimp harvest, and Cook Inlet Dungeness are confidential because 2 or less fishermen participated in the respective fisheries.

The approximate exvessel value by species was \$178,000 for razor clams, \$12,000 for octopus, \$66,000 for hardshell clams (including mussels), \$30,000 for trawl shrimp, \$2,000 for sea cucumbers, \$8,000 for pot shrimp, \$198,000 for scallops and \$500 for Dungeness. Total estimated exvessel value of all shellfish species for the Cook Inlet Management Area for the 1996-97 seasons was approximately \$0.5 million.

DUNGENESS CRAB FISHERY

Introduction

The majority of the commercial, sport, and personal use Dungeness crab fishing in Cook Inlet has occurred in the Southern District which includes Kachemak Bay (Figure 1). A small amount of crabs has been harvested in the Central and Kamishak Districts. During the 1960's and early 70's commercial catch and effort were usually not a function of resource abundance; the harvest instead was a result of opportune market conditions created by fluctuation in the catches from the west coast Dungeness crab fisheries.

Although low level, sporadic effort has occurred since statehood, catch and effort first increased significantly in 1978 when 1.2 million lb were taken by 49 vessels. Subsequently favorable market conditions and the need of fishermen to find alternative fisheries have kept effort high. Since 1978 annual harvests have ranged from a low of 29,502 lb in 1990 to a high of 2.1 million lb in 1979. The commercial fishery has been closed in the Southern District from 1991 through 1995 due to low overall abundance. The average annual harvest for the entire management area since 1978 was 1.01 million lb (Figure 3). Effort has ranged from 1 vessel in 1993, 1994, and 1995 to 108 vessels in 1982 (Appendix A). After 1978, 92 percent of the crabs were harvested between the months of June and October, and 59 percent of the annual harvest was taken from the waters east of Homer Spit; however, the proportion changed considerably on an annual basis,

which was a result of varying recruitment between the waters east and west of the Spit (Appendix B).

Ninety percent or more of the Dungeness fleet were residents of the Kachemak Bay communities of Homer and Seldovia. The fishing vessels were in the 40 ft and less size class. Smaller vessels without circulating tanks generally fished the waters east of Homer Spit while larger vessels with circulating tanks fished the deeper somewhat rougher waters west of the Spit.

The 1994 Board of Fisheries substantially changed the regulatory structure used to manage the Southern District as well as the remainder of the Cook Inlet Management Area commercial Dungeness crab fishery. A summary of these regulations is as follows:

- 1) The Southern District was divided into 2 subdistricts: Subdistrict 1 which includes the waters east of Homer Spit, and Subdistrict 2 which includes the waters west of Homer Spit.
- 2) Commercial fishing seasons and depth limitations for the Southern District as follows:
 - A) Subdistrict 1 is open August 1 through August 31 in waters of 10 fathoms or less only.
 - B) Subdistrict 2 is open from July 15 through August 31 in waters of 40 fathoms or less only.
- 3) The season for the remaining districts of the Cook Inlet Management Area is June 1 through December 31, and from January 15, or the beginning of the commercial Tanner crab season, whichever is later, through March 15.

- 4) Pot limits with a buoy tag and color code requirement were established as follows:

A) Southern District: 150 pots.

- 1) Subdistrict 1: 50 pots, which are included in the overall district limit of 150 pots.

- 5) Dungeness crab line cannot be floating on the water surface unless it is the line connecting the main buoy to the auxiliary buoy.

Statewide biological regulations for the commercial Dungeness fisheries consist of a males only harvest and a minimum legal size of 6.5 in carapace width. Gear regulations include a provision for two $4 \frac{3}{8}$ in escape rings per pot and a biodegradable twine escape mechanism.

Historically the Cook Inlet Dungeness fishery evolved into a summer event for the following reasons:

- 1) Salmon fishermen are occupied with salmon fishing, thus creating a niche for fishermen who do not hold permits for limited entry fisheries.
- 2) The weather is better.
- 3) The tourist industry is at its peak providing a good marketing opportunity..
- 4) Recruitment (the molt) occurs.

Some level of fishing had occurred throughout the year. Catch and effort, however, increase significantly after the major molt, which provides new recruit crabs. The period of significant molting for adult males in Kachemak Bay can occur from late April through mid-September in any given year although the peak months are June and July. The molt is stimulated by water

temperature and physiological condition of the crabs. The inconsistency in molt timing between years is partially explained by the significant annual spring-summer temperature variation in the shallower north temperate and subarctic waters of Alaska.

Within Kachemak Bay itself, molting generally occurs somewhat earlier in the waters east of Homer Spit than in the waters west of the Spit where the influence of Cook Inlet proper is much greater. Newly molted legal crabs are often caught east of Homer Spit one month or more before appearing in the gear west of the Spit. Crabs east of Homer Spit are most likely resident from the first post-larval instar up to legal size. Those legal crabs captured west of the Spit, however, may actually be reared as juveniles in the waters of Cook Inlet north of Anchor Point. Catches of small crabs by upper Cook Inlet salmon set netters and casual observations of molted exoskeletons by the general public indicate significant numbers of Dungeness reside in upper Cook Inlet.

Outside of natural population fluctuations, three fishing related factors have had a notable negative impact on this fishery:

- 1) Depression of the stock due to handling and trapping mortality that was the result of fishing during and immediately after the molting period.
- 2) Extremely high effort and resultant high annual fishing mortality due to ease of access by both commercial and recreational fishermen.
- 3) Violation of the 150 pot limit by a portion of the fleet.

The combination of extended heavy fishing pressure and fishing during and immediately after the major molting period for adult males has played the most significant part in the recent sharp decline in the Dungeness crab harvest. Mortalities associated with handling and trapping may not have been significant during the 1960's and early 70's when effort levels were low and stock

abundance was high; however, since then the level of fishing accelerated not only in amount of vessels and pots, but also in the amount of time each year that the gear was deployed.

In 1990 the department began a survey to further document the molt timing of the catchable Dungeness crabs and to establish an index of abundance. This survey in tandem with the crab trawl survey indicated one or two significant year classes moving toward the fishery. Although these animals appear numerous, particularly when compared to the surrounding weak year classes, the following must be weighed when considering the magnitude of this group of crabs: 1) the crabs were only located in the portion of Kachemak Bay east of Homer Spit, and 2) they exhibited an extremely high level (approximately 50 percent) of skipmolting in 1992, 1993, and 1994, the years when they should have fully recruited into the fishery and provided significant numbers of both recruits and postrecruits available for harvest. These animals are now passing through the end of their life cycle as evidenced by both a decline in the department's survey catches and harvest by recreational fishermen.

1996 Season Summary

The commercial fishery was not opened in the Southern District (Kachemak Bay) in 1996 due to: 1) a relatively low number of legal males, and 2) the necessity to protect the remaining non-legal catchable crabs in the district from handling and trapping mortality.

One fisherman delivered crabs from the Central District which is north of Anchor Point. The catch data are confidential. This district is difficult to fish with pots because of the Cook Inlet outflow which results both in rapid siltation of the gear and the lengthy daily period of time that the buoys are submerged. Furthermore, it does not appear that substantial numbers of legal males inhabit this district even during past years of high commercial catch in the Southern District. Within the past 25 years, the largest documented harvest in the management area outside of the Southern District was 43,000 lb in 1988. The 117,000 lb in 1966 was apparently a one time event from the Kamishak District (Appendix A).

Limited entry was adopted into the Cook Inlet Management Area commercial Dungeness Fishery in 1993. The limit was set at 103 pot fishermen and 2 ring net fishermen. Limiting entry to this large number of participants will be of no inseason management value.

1997 Management Outlook

The department plans to begin the next annual Dungeness pot survey in May, 1997. The survey will be conducted on a monthly basis through August. The commercial fishery will remain closed until department surveys signify that sufficient recruitment into the adult and legal segments of the stock has occurred.

The commercial season in the remaining districts of the management area will be open in 1997. The only district likely to see any effort is the Central District which is in central Cook Inlet north of the Southern District.

AREA H TRAWL SHRIMP FISHERY

Introduction

Cook Inlet is separated into two shrimp registration areas: Area H, which includes the Southern, Kamishak, and Barren Islands Districts; and Area G, which includes the Outer and Eastern Districts (Figure 2).

All of the commercial trawl shrimp fisheries in Area H have occurred in the Southern District. Harvests reached the 5 million lb level in the late 1960's and remained near that point through the early 1980's (Figure 4 and Appendix C). Low stock abundance resulted in partial closures of the fishery during the mid-1980's and total closure beginning in the fall of 1986. Effort has varied

from a low of one vessel during 1968 to a high of 23 in 1981. Prior to 1983, most commercial fishing occurred west of Homer Spit, but between 1983 and 1986 virtually all effort shifted to the area east of Homer Spit. The fishery has been closed from 1986 through 1996.

The Southern District (Kachemak Bay) trawl shrimp fishery is characterized by superexclusive registration and management under the Kachemak Bay Trawl Shrimp Management Plan. This plan has three basic features:

- 1) An annual guideline harvest level determined from stock assessment surveys.
- 2) Annual harvest spread out over the entire fishing season utilizing 3 separate regulatory sub-seasons.
- 3) Sub-season harvest spread out in equal weekly guideline harvests.

Also, 2 areas are closed to trawl shrimp fishing: the first includes the majority of upper Kachemak Bay east of Homer Spit, originally established because the area consistently contained small, juvenile pink shrimp; the second includes Tutka Bay and Sadie Cove, established because the area encompassed by these bays lent itself to the potential of overharvest.

Pink shrimp (*Pandalus borealis*) historically made up the bulk of the commercial harvest, with sidestripes (*Pandalopsis dispar*) seasonally making up a smaller but often significant portion of the catch. Humpy shrimp (*Pandalus goniurus*) have at times comprised up to half of the harvest, but this species appears to undergo erratic population fluctuations; contributions to the most recent fisheries have been negligible. Coonstripe shrimp (*P. hypsinotus*) consistently made up less than 5 percent of the catch.

Trawl shrimp surveys have been conducted in Kachemak Bay since 1971. These surveys, which determine each season's guideline harvest level, have indicated significant declines in abundance

and distribution of all pandalid shrimp stocks in Kachemak Bay since the late 1970's (Figure 5). These declines led to the aforementioned commercial closures from 1986 to 1996.

1996-97 Season Summary

The fishery remained closed for the 1996-97 season based on the results of the 1995 department trawl shrimp survey. The 120,000 lb population estimate generated by the 1993 survey documented the smallest population of pandalid shrimp since the inception of the survey. The 1995 survey results indicated a slight increase in abundance to 446,000 lb of pandalids. To put these survey data into perspective: the commercial fishery averaged over 5 million lb annual harvest during its peak; the 1995 population estimate of 446,000 lb is 9 percent of that peak which represents the commercial catch only. Despite some shift in size composition and distribution, all information collected during this survey indicated that the stocks remained depressed by historical standards.

1997-98 Management Outlook

The department will conduct the next Southern District trawl shrimp survey during May - June, 1997. Results from the survey will determine management for the 1997-98 season, however, the outlook for a commercial season is poor.

AREA G TRAWL SHRIMP FISHERY

Introduction

Statistical Area G is a nonexclusive shrimp registration area encompassing the Outer and Eastern Districts of Cook Inlet (Figure 2). The first year of significant harvest occurred in the 1982-83

season when 4 vessels caught 239,584 lb (Figure 6 and Appendix D). The catch increased steadily for the next 2 seasons to a peak harvest of just under 2.0 million lb taken by 11 vessels during the 1984-85 season. Before 1992, pink shrimp comprised 90 percent of the harvests; the remaining 10 percent was sidestripes. Trawl CPUE was never high, rarely approaching 1,000 lb per hour. Logbook information collected over time indicates that fishermen in Area G made long tows, often with extremely low catch results. From 1992 through 1995 the delivered catch was comprised entirely of sidestripes as the vessels targeted on these more valuable animals. Once again, long tows and low CPUE were characteristic of this fishery.

Prior to 1985, the season for shrimp trawling in Area G was open year-round. A regulatory season, beginning June 1 and ending February 28, was adopted by the Board of Fisheries for Area G in the spring of 1985.

1996-97 Season Summary

The Area G season opened by regulation on June 1, 1996 and remained open for the entire season. The catch is confidential due to participation by 2 or less fishermen. Harvest occurred in both the Outer and Eastern Districts. Catch rates were comparable to previous years and indicated little change in stock status.

1997-98 Management Outlook

Initial guideline harvest levels for the 1997-98 season will be set from 0 to 100,000 lb per district, or 0 to 200,000 lb for Area G. Natural and fishery induced fluctuations in sidestripe stock abundance remain poorly understood in the Outer and Eastern Districts. The guideline harvest range will therefore again be set broadly at 0 to 100,000 lb per district. Fishery performance and dockside samples will again be significant factors in determining the status of the stock and ultimate management.

AREA H POT SHRIMP FISHERY

Introduction

Similar to trawl shrimp, the Cook Inlet Management Area is separated into 2 distinct registration areas for the pot shrimp fishery: Area H, consisting of the Southern, Kamishak, and Barren Islands Districts; and Area G, consisting of the Outer and Eastern Districts (Figure 2). Historically the major pot shrimp fishery occurred in the Southern District.

Commercial catch figures show that the fishery suffered steep declines in annual harvest until the closure in 1988 (Figure 7 and Appendix E). Pot shrimp fishing in Kachemak Bay was primarily undertaken by small vessel fishermen that develop their own markets. The target species is the coonstripe shrimp, the most abundant pot caught shrimp in Kachemak Bay. Spot shrimp (Pandalus platyceros) also occur in the bay but their contribution to the fishery is generally negligible. Each regulatory fishing season, which began June 1 and ended March 31, was managed via 3 separate subseasons with appropriate guideline harvest levels set for each subseason.

Prior to 1986, guideline harvest levels were determined by the Department's two annual pot shrimp surveys as well as by voluntary commercial fishery performance information. All pot shrimp surveys were subsequently eliminated in the Cook Inlet Area. Fishery performance data in the form of voluntary logbooks were collected consistently during 1986 and 1987 and were the sole criteria used to judge stock status during those years. The department trawl surveys and information from local personal use fishermen continued to indicate that stock of coonstripe shrimp in Kachemak Bay was depressed. The fishery has been closed to commercial harvest since 1988.

1996-97 Season Summary

To determine the status of the coonstripe shrimp stock the department relies on data obtained from the trawl shrimp surveys and voluntary information from personal use fishermen. The 1995 trawl survey indicated a population estimate of less than 4,000 lb of coonstripe shrimp for Kachemak Bay. These results showed a depressed stock when compared to historical survey catches that generated population estimates up to 1.0 million lb. Furthermore, voluntary information offered by personal use fishermen since 1988 has indicated very poor catches when compared to historical averages. The personal use shrimp pot fishery was closed beginning April, 1996.

The aforementioned trawl survey and personal use fishery information indicated low likelihood of significant recovery of the the coonstripe stock in Kachemak Bay, therefore, the fishery was closed by emergency order for the 1996-97 season.

1997-98 Management Outlook

All information collected during 1993, 1994, and 1995 indicated that stocks of pandalid shrimp continue to be depressed in Kachemak Bay. Pending the results of the May-June, 1997 shrimp trawl survey, the fishery will remain closed for the entire 1996-97 fishing season in order to promote growth, recruitment, and reproduction in the coonstripe shrimp stock.

AREA G POT SHRIMP FISHERY

Introduction

Similar to the trawl shrimp fishery, Statistical Area G, or Outer Cook Inlet, includes the Outer and Eastern Districts (Figure 2). Currently there are neither season restrictions nor biological regulations governing the pot shrimp fishery. The target species is the spot shrimp; coonstripes and pinks are harvested to a lesser extent. Spot shrimp have comprised 57 to 94 percent of the catch averaging 83 percent. Since 1977 catch and effort have remained low, never exceeding a reported annual harvest of 20,500 lb whole shrimp caught by 8 participating vessels in 1989 (Figure 8 and Appendix F). Despite the extensive coastal area, historical information collected from this fishery indicates that the measurable stocks of spot and coonstripe shrimp occur within some (but not all) bays and are of limited abundance.

1996 Season Summary

The commercial season was open by regulation for the entire 1996 calendar year. Catch data are confidential because a single fisherman reported commercial harvest. Based upon catch rates, shrimp stocks available to pot gear remain very low.

Effective January 1, 1996, all commercial pots were required to be partly covered by rigid mesh, which must have 7/8ths inch minimum diameter openings. This regulation was designed to reduce handling of small non-marketable shrimp thereby decreasing avoidable fishing mortality. Similar regulations are utilized in the Prince William Sound Management Area, Southeast Region, and State of Washington.

1997 Management Outlook

The fishery will open by regulation. Fish ticket and voluntary fisherman interview information are the only sources of data used to evaluate the Area G pot shrimp fishery. This information will be evaluated inseason to determine if any restrictive management action is necessary.

SCALLOP FISHERY

Introduction

The commercial scallop fishery in the Cook Inlet Management Area (H) began in 1983. The target species for the fishery is the Pacific weathervane scallop (Patinopecten caurinus). In 1983 and 1984 the Alaska Board of Fisheries responded to a public proposal by directing the department to allow restricted exploratory fisheries for scallops. These initial fisheries were characterized by low effort due to severe permit restrictions when compared with traditional scallop fisheries both inside and outside Alaska. The most important restrictions were:

- 1) Legal gear limited to a 6 foot wide dredge with minimum ring size of 4 inches inside diameter.
- 2) Only 1 unit of gear allowed on board at any one time.
- 3) Mandatory log book completion.
- 4) Contact with the Homer office prior to and at the completion of each trip.
- 5) An agreement to carry department observers on board if requested.

Except for some brief exploratory fishing elsewhere in the Kamishak District in 1984 and in the Outer District in 1987, a single bed of scallops near Augustine Island in the Kamishak District has sustained almost the entire harvest since the fishery began in 1983 (Figure 1). Using the state research vessel Pandalus, the department conducted an assessment survey in August, 1984 to define the extent of this particular bed and to aid in establishing appropriate harvest levels.

Based on information from the 1984 survey as well as data from the initial fisheries, the 1985 Board of Fisheries adopted regulations for scallops in Cook Inlet. These regulations included a season in the Kamishak District from August 15 through October 31, a guideline harvest level of 10,000 to 20,000 lb (changed to 0 to 20,000 lb in 1994) of shucked meats, and the restrictions mentioned previously (except for the single unit of gear provision). Commercial fishery performance has been used inseason to adjust guideline harvest levels. Historic harvest and effort peaked fishery during 1994 when 4 vessels took 20,431 lb of shucked meats (Figure 9 and Appendix G).

By regulation the Southern District was not open to scallop fishing in order to protect crab stocks, while the Outer and Eastern Districts were opened year round to encourage exploratory fishing.

In 1987 review of inseason fishery performance data clearly demonstrated that the Kamishak District stock had taken an unexpected decline. Substantial undocumented information indicated that the Kamishak scallop bed had been fished illegally between the 1986 and 1987 seasons. Regardless of the reason for the sharp decline in abundance, the department closed the fishery.

No commercial effort occurred in Cook Inlet from 1988 through 1992. Although some local fishermen expressed interest in fishing during these years, the potential of a fishery closure after one trip did not warrant the investment in time and effort because the department told fishermen that their catch data would be used to justify continuance of the fishery. Fishermen speculated

that the probability of good catches were low. Information required from the fishermen would have included logbooks, shell samples, interviews, and a potential for observers.

In 1993 the fishery was essentially redeveloped when a single fishermen took a chance and began fishing the Kamishak District scallops. After his initial trip it was apparent that the stock had recovered to near historic levels. Two other boats joined the fishery before the season was over. The resultant catch was 20,115 lb. Logbooks and shell samples indicated a small but healthy stock of weathervane scallops once again existed near Augustine Island.

In early 1995 a single vessel commercially fished scallops in a venture that was illegal by state law. This occurred in federal waters off Kayak Island (adjacent to the Prince William Sound Management Area) and resulted in the closure of all commercial scallop fisheries in federal waters. Virtually the entire stock of scallops in the Kamishak District resides in federal waters. Although state waters opened by regulation on August 15, 1995, no one fished as fishermen did not want to waste their time in an area where few scallops existed.

1996 Season Summary

The department surveyed Kamishak Bay scallops during June, 1996. The survey results in combination with recent fishery data were used to set a guideline harvest level of 28,000 lb for the 1996 fishery.

The state and federal regulatory problems that provided a loophole for illegal fishing during 1995 were resolved and the Kamishak District scallop fishery opened by regulation on August 15, 1996. The fishery closed by emergency order at 08:00 hours on August 27, 1996 due to attainment of the guideline harvest level. Five vessels delivered 28,228 lb of weathervane scallop meats in 7 landings during the 12 day fishery.

The department monitored the fishery via logbooks, shell samples, skipper interviews, and a trip by a staff biologist aboard one of the vessels. Interviews occurred at the end of each trip.

Catch, catch per unit effort (cpue) data and shell samples indicated the distribution, density, and age of the stock compared favorably to historic levels. The 1996 fishery cpue of 52.9 lb per hour towed is the historic high for the fishery and an improvement over the 1994 fishery cpue of 44.6 lb per hour towed. Ages of the scallops in the shell samples indicated that age classes over 7 comprised approximately 50% of the catch.

Crab bycatch limits were set at 25,000 Tanner crabs and 60 king crabs. These limits were a function of 1/2 of one percent of the 1994 crab population estimate generated from the 1996 department trawl survey in Kamishak. Crab bycatch in the 1996 scallop fishery totalled 10,164 Tanner crabs and 29 king crabs.

Fishing patterns changed during 1996 with some vessels fishing around the clock while others would shut down for a portion of the night. Another significant difference was the addition of freezing capability aboard one of the vessels. Participants typically ice the catch and deliver periodically through the season, however, with enough freezing capacity a vessel can fish through the season.

No fishing occurred in the Outer and Eastern Districts of the Cook Inlet Area. Historically, only a single documented landing of approximately 1,100 lb has occurred from these areas.

1997 Management Outlook

The Kamishak District fishery will open by regulation on August 15, 1997. The preseason guideline harvest level will be 20,000 lb. Management of the fishery will be similar to 1996 and the ultimate harvest level will be determined based upon information collected inseason. Crab bycatch limits will be set based upon the department trawl survey. The department plans to place at least one observer aboard a vessel during the fishery. If the changes in fishing patterns observed during 1996 continue, and weather does not prohibit fishing, it is likely that the seasons will shorten.

The scallop fishery in the Outer and Eastern Districts will be managed by regulation, which includes a requirement for an observer. The department does not anticipate significant effort or catch from these districts. Most recently, exploratory fishing by 2 large commercial scallopers in 1994 yielded a catch of 11 scallops.

HARDSHELL CLAMS AND MUSSELS

Introduction

Documented commercial hardshell clam and mussel harvests in the Cook Inlet Management Area began in 1986. The generic term, hardshell clams, generally refers to littleneck (*Protothaca staminea*) and butter clams (*Saxidomus giganteus*). From 1986 through 1995, the annual harvest of hardshell clams has ranged from 14,500 lb to 71,025 lb. In 1989 the bulk of the clam harvest went to sea otter food for a rehabilitation project resulting from the Exxon Valdez oil spill. In the remaining years the majority of the harvest was Pacific littleneck clams that went to Kenai Peninsula and Anchorage markets. Effort has ranged from 2 to 33 hand diggers (Figure 10 and Appendix H). The entire documented commercial harvest was taken from Kachemak Bay (Figure 1).

Before harvesting clams or mussels for human consumption, an area must be certified for water quality by the Alaska Department of Environmental Conservation (DEC) in accordance with the National Shellfish Sanitation Program. DEC must also check for paralytic shellfish poisoning (PSP). Lot sampling was the method that DEC utilized to check for PSP. In 1986 DEC permitted the use of lot sampling for Chugachik Island (near Bear Cove) in Kachemak Bay. Through 1989, Chugachik Island, Halibut Cove Lagoon, Kasitsna Bay, and Jakalof Bay, all in Kachemak Bay, were certified for lot sampling. At the end of 1989 Tutka Bay was also certified

by DEC. The most recent certification occurred in 1994 when DEC departed from the lot sampling strategy and in an all encompassing move approved all the Southern District hardshell clam subdistricts on the south side of Kachemak Bay essentially between Bradley River and Barabara Point (Figure 11).

Only 102 lb of blue mussels were commercially harvested prior to 1989. Annual mussel harvest rarely exceeds 1,000 to 2,000 lb. In 1989, however, the catch rose to over 167,000 lb. The mussels were utilized for food in an otter rehabilitation project which was a result of the Exxon Valdez oil spill (Appendix I).

Prior to 1994 Board of Fisheries action, regulations for the Kachemak Bay hard shell clam fishery were minimal. Minimum sizes were established by the Board in 1990 for Pacific little neck clams at 1.5 in and butter clams at 2.5 in.

In 1994 the department developed a management strategy via proposals to the Board of Fisheries that looked to long term sustainable use of the hard shell clam resource in Kachemak Bay. Key to the management plan was an alternate year commercial harvest strategy which opens half of the certified beaches on 1 year, and the other half during the following year. Other features of the plan included the following commercial restrictions:

- 1) areas of high recreational value will be closed,
- 2) weekends will be closed from May 15 through September 15, and
- 3) a registration deadline of April 1.

The board adopted this plan which served to spread the catch and effort over a larger area, allow for a year of unfished growth and recruitment, provide noninvasive recreational opportunity, and permit the department to anticipate effort.

The plan also included regulations which affected the recreational users:

- 1) a minimum legal size for littleneck and butter clams of 1.5 and 2.5 in shell length, respectively (both of these are the same as the commercial size limits), and
- 2) a bag and possession limit of 1,000 littleneck clams and 700 butter clams.

These recreational fishery regulations reduced waste of the resource, aided in maintenance of the reproductive segment of the stock, and most importantly allowed for enforcement of commercial closures.

1996 Season Summary

Total 1996 hardshell clam harvest was 53,757 lb hand dug by 25 permit holders. Littlenecks comprised greater than 99 percent of the hardshell harvest at 53,524 lb. Butter clams made up the remainder of the catch at 233 lb (Table 2).

The open subdistricts were 2, 3a and 4, which included significant clam beaches on the north and east sides of Sadie Cove. Ismailof Island closed February 18 when the 4,000 guideline harvest level was attained. An area at the head of Sadie Cove (south of 59°30') closed on August 8 in an effort to distribute the harvest into other areas for the balance of the year.

The department met with interested members of the commercial clam industry on December 7, 1995 to discuss management of the 1996 fishery. Based upon these discussions the department initiated a temperature dependent harvest strategy designed to avoid commercial clam harvest in cold temperatures during the period November 1 through March 15 and quarterly harvest limits.

Under the temperature dependent strategy, the department opened commercial clam digging in 48 hour increments during a minus tide series only if the windchill temperature was above 20 degrees F or if the ambient air temperature exceeded 32 degrees F. From November 1 through the end of the season on December 31, commercial clamming digging was open a total of 6 days.

Quarterly harvest limits were set by dividing the allowable harvest equally into each quarter of the year. This allowed the department sufficient time to review logbooks, catch samples, and survey data to determine if continued harvest would result in the likely reduction in sustainable yield from a given area.

Blue mussel harvest for 1996 totalled 2,420 lb taken by 3 commercial diggers.

1997 Management Outlook

Subdistricts 1 and 3b will be open for the 1997 season. The department has set a preseason guideline harvest level of 60,000 lb. Management will be similar to 1996 including the quarterly harvest limit and temperature dependent openings. The quarterly harvest limit was effective by allowing the department adequate time to receive fishery information and adjust management of the fishery. The department will continue to survey commercially harvested beaches during minus tide series through the summer months. The Alaska Board of Fisheries will consider several proposals that would close Kachemak Bay or portions of it to commercial clam harvesting. If these proposals are adopted, it is likely that the guideline will be reduced to provide for a sustainable fishery.

SEA URCHINS

Introduction

The green sea urchin, the smallest of the commercial urchins, is the only urchin species in Cook Inlet which occurs in quantities sufficient to support a commercial fishery. Green urchins, and commercial fisheries for them, occur along the U.S. and Canadian coasts including the Province of British Columbia, the Maritime Provinces of Eastern Canada and the States of Maine and Alaska. Fisheries also occur in the north temperate and subarctic waters of Europe including the Soviet Union. Green urchins are harvested solely for their gonads, considered a delicacy in the orient.

Although red urchins (*Strongylocentrotus franciscanus*) do occur in small, isolated beds within the Cook Inlet Management Area, their sparse abundance and distribution does not justify a commercial fishery; therefore, no permits are issued.

No commercial harvest for green urchins occurred in Cook Inlet prior to 1987. From 1988 to 1992 the harvest ranged from 224 to 20,445 lb of whole urchins. Catch and effort surged during the 1993-94 season when 195,403 lb were taken by 29 divers (Figure 12 and Appendix J).

By regulation each fisherman must obtain a miscellaneous species permit prior to harvesting urchins commercially. An additional regulatory requirement limits allowable methods of harvest to hand picking or the use of an abalone iron, both intended to minimize disruption of the substrate. Utilizing available published information on this species as well as the framework of past management practices for the red urchin in southeast Alaska, the department established the following permit restrictions for green urchin harvest within Cook Inlet:

- 1) A minimum legal size of 2.0 in measured across the test, which does not include the spines. The minimum size is intended to protect the broodstock and sufficient

numbers of large urchins, which in turn may provide a canopy that helps protect the smaller urchins.

- 2) Permit duration from mid-September through mid-December, the time period when the gonads may be at their fullest and therefore of highest market quality. The permit period may be extended past mid-December if recovery data are made available to the department.
- 3) Alternate year harvest strategy between that portion of Kachemak Bay east of Homer Spit and that portion west of the Spit, in order to reduce the probability of a recruits only fishery.

Although the historical harvest database is composed of only 7 years, an alternate year pulse in catch can be detected. The years of low harvest or no effort are the result of the alternate year closure that includes China Poot Bay, which up to this point is the most productive bay for commercial quality green urchins in Cook Inlet. It also appears that the urchins are capable of larger sizes in China Poot.

To this point, logistics and abundance have played a significant role in determining location of urchin harvest. Virtually all the fishing effort and all the reported harvest have come from Kachemak Bay. Because the season occurs during the fall/winter storm months, harvesting among the bays of the outer coast presents not only problems for the divers themselves, but also creates difficulty getting the urchins to market regularly. Timing of delivery to the processor is important because urchin buyers are very particular regarding both recovery percentage and overall quality. A recent low level of effort, however, has not indicated any substantial urchin resource in the outer coast of the Kenai Peninsula.

In 1995 the department utilized a permit season that allowed for direct input from the commercial divers and processors in order to set the opening when recovery of most of the urchins was near optimal. Once this industry generated figure was achieved, permits were to be issued for three

) day open fishing periods per week. This would allow the department ample time to collect logbooks, fish tickets, conduct interviews, and sample the landings. Catch, catch per unit of effort, distribution of effort, and spawning condition would determine the termination of permits (season closure).

The abovementioned system was made difficult because of differences of opinion among divers on condition and abundance of the urchins. As a result the department took the most conservative route, utilized information from only the most experienced divers and buyers, and did not include China Poot Bay in the area opened by permit. Most of the subsequent effort was focused on upper Kachemak Bay from Bear Cove to Peterson Bay with no effort in the remainder of the management area.

The only buyer interested in providing the department with recovery data indicated that the urchins were in a high quality condition justifying a 3 day opening beginning December 1. Due to both weather and low price, only 994 lb were delivered for the subsequent 12/1-4 or 12/8-11 open periods. The harvest for the 12/15-18 period was 2,301 lb. This was the last open period as the department stopped issuing permits because of low reported abundance. The total 1995 season's harvest was 3,295 lb taken by 9 divers.

1996-97 Season Summary

The season was open for a total of 9 days or 3 weekend fishing periods. Two permits were issued, however, no effort was reported. Weather and mechanical failures were given as the reasons for not fishing.

Similar to 1994 and 1995, the department maintained the alternate year harvest strategy for areas east and west of Homer Spit. Only the portion of Kachemak Bay west of Homer Spit and east of a line from Anchor Point to Point Pogibshi was open for the 1996-97 season. Over the short

history of the fishery, this area has sustained very low harvest or no effort during the years it has been open.

The season opened by permit for three day periods, 12:00 noon Friday to 12:00 noon Monday, beginning the first Friday after December 1. This is the season opening date that the department has proposed to the 1997 Board of Fisheries for consideration as a regulatory opening of the urchin fishery within Kachemak Bay. Permit stipulations also included the following:

- 1) 2 inch test width minimum size requirement.
- 2) logbooks submitted weekly regardless whether diving occurred.
- 3) all product landed within 24 hours of the weekly closure.

The area outside of Kachemak Bay was also open continuously from December 1 - 23. Similar to past years, there was no effort and little interest expressed in fishing this area because of the distance from markets and the typically inclement weather during the open season.

1997-98 Management Outlook

The 1997-98 season will again open no earlier than December 1. That portion of Kachemak Bay east of Homer Spit will open. This includes China Poot Bay which has historically provided most of the harvest. The remainder of the Cook Inlet Management Area outside of Kachemak Bay will also open.

China Poot Bay was last open to commercial harvest in 1993. Due to the very high harvest from the bay in 1993 and the controversy surrounding reported urchin abundance there in 1995, the department will take a conservative approach to management in 1997. The season will initially open for 48 hours. The department will closely monitor the fishery and enforce the catch

reporting requirement. Fish ticket, logbook, and interview information will determine the development of the 1997-98 fishery.

SEA CUCUMBERS

Introduction

Prior to 1990, the Cook Inlet Management Area had no documented harvest history of the sea cucumbers. In 1990, 2 divers harvested 22,525 lb of cucumbers. The entire catch was taken from Sadie Cove in Kachemak Bay. Although there was sporadic effort with no catch from 1991 and 1992, the next commercial harvest did not occur until fall of 1993. The department began managing the fishery via a permit season (10/1-04/30) in 1993-94 (Appendix K).

No information is available regarding the extent, distribution, or life history of this species in the management area. No regulations or harvest guidelines specific to the commercial harvest of cucumbers are in effect for Cook Inlet. In the absence of biological information, the limited fishery for this species has been managed via miscellaneous species permit. The major provisions of the permit are mandatory logbooks, time, and area restrictions.

Although sea cucumbers have been reported throughout Cook Inlet, particularly within Kachemak Bay, the limited commercial harvest as well as exploratory effort indicate that the stocks are neither dense nor extensive. Historically, most harvest has occurred in Tutka Bay and Sadie Cove. There is another genus of sea cucumber, Cucumaria sp., which exists in noticeable abundance in portions of the management area. This animal however is of no commercial value.

1996-97 Season Summary

The 1996-97 cucumber permit period extended from October 1, 1995 to April 30, 1996. As part of the alternate year harvest strategy the area of Kachemak Bay west of Homer Spit, including Tutka Bay and Sadie Cove, were open. An upper harvest limit of 15,000 lb or 50% of the historical harvest was set for the fishery. A total of 8 permits were issued for sea cucumbers. Total harvest was 1,528 lb harvested by 3 divers during 12 days of diving. Fishery cpue was 49 lb per hour, somewhat lower than the 1994 fishery cpue of 56 lb per hour. Effort was spread over the open area and therefore, indicative of abundance. The department closed the fishery by emergency order on November 1, 1996. Interviews with participants indicated that densities of large sea cucumbers in areas previously harvested in past seasons were very low while some smaller, unmarketable animals were in evidence.

1997-98 Management Outlook

The department does not plan to open Kachemak Bay for the 1997-98 season. Under the alternate year harvest strategy, the area east of Homer Spit would open. Historical fishery data do not indicate commercial abundance of sea cucumbers in the upper bay. During the most recent season in the upper bay (1995-96), diver interviews indicated very limited quantities of cucumbers characterized by sparse distribution. No harvest occurred in 1995-96.

For areas outside of Kachemak Bay, the season dates will be October 1 through April 30 unless closed earlier by emergency order. Factors that will be considered in justifying a closure will include catch, effort, distribution of catch and effort, and catch per unit of effort.

OCTOPUS

Introduction

The harvest of octopus in the Cook Inlet area has historically occurred incidentally to other directed fisheries such as the commercial Tanner crab, groundfish pot, longline, and trawl fisheries. Cook Inlet octopus harvest records are currently available since 1983. Catches have ranged from 435 to 48,000 lb with effort fluctuating from 8 to 41 boats (Appendix L). The catch from the high harvest years was the result of bycatch from groundfish fisheries. In the past 5 years increased interest has occurred in directing effort specifically towards octopus. Many different gear types have been tried but the resultant harvest has been negligible. Most of the effort has focused on Kachemak Bay.

There are no closed seasons or size limits for octopus at the present time, but a miscellaneous species permit is required prior to fishing a given registration area. Cook Inlet permit restrictions include short permit duration (typically one to four months), specific reporting requirements, and a detailed description of gear to be utilized. This last requirement prevents use of king, Tanner, Dungeness, or shrimp pots in order to reduce or eliminate the probability of bycatch of those species.

1996 Season Summary

Directed fishing by 3 fishermen resulted in a catch of 2,215 lb taken entirely within the waters of Kachemak Bay. Approximately 6,000 lb were landed as bycatch from the 1996 groundfish fishery.

1997 Management Outlook

The high prices paid for octopus in recent years, publications promoting the potential octopus fishery in Alaska, and the attraction of an alternative fishery are all expected to produce a continued interest in octopus as a target species during 1997. Interest in the fishery will likely be somewhat tempered by the lack of substantial success by efforts in previous years.

The extent of this resource in Cook Inlet outside Kachemak Bay is undetermined and could ultimately affect any directed fishery. In the absence of an effective method of harvest, the Cook Inlet octopus catch is not expected to increase significantly in 1997 unless it is a result of bycatch from a groundfish pot or longline fishery.

RAZOR CLAMS

-Note- The razor clam chapter of this report is a contribution of the Soldotna Office, CFM&D Division, ADF&G.

Historically the Cook Inlet Razor clam fishery on the west side of Cook Inlet has been confined to the area between Crescent River and Redoubt Point. All clams harvested in this area are directed by regulation to be sold for human consumption, except for the small percentage (less than 10%) of broken clams which may be sold for bait. Razor clams are present throughout this area with especially dense concentrations in the Polly Creek and Crescent River areas. Beginning in 1993 the Department of Environmental Conservation certified additional area for human consumption, north of the existing Polly Creek certified beach, to Redoubt Creek. In 1994 this certification was extended north to Harriet Point. In the remainder of the Upper Cook Inlet Management Area there are no restrictions on the amount of clams that can be sold for bait. Currently there is no directed effort to harvest Razor clams for the bait market. The minimum legal size for Razor clams is four and one-half inches (114mm) in shell length.

The season's harvest taken primarily from the Polly Creek/Crescent River area was 355,448 pounds (Appendix M). Diggers were paid an average of \$.50 per pound for their harvest making the total exvessel value \$178,000.

Table 1. Numeric listing of commercial shellfish emergency orders, issued for the Cook Inlet Management Area for the 1996 and 1996-97 seasons.

Emergency Order Number	Effective Date	Explanation
2-S-H-01-96	January 1, 1996	Closes commercial clam and mussel fishery in the Southern District (Kachemak Bay) until ambient windchill conditions will not adversely affect the survival of sublegal and non-commercial clams that are disturbed during the clam digging process.
2-S-H-02-96	January 3, 1996	Supersedes e.o. number 2-S-H-01-96 and opens the commercial clam and mussel fishery in all of Subdistricts 2, 3-A, and 4 in the Southern District from January 3 through January 4.
2-S-H-03-96	January 5, 1996	Supersedes e.o. No. 2-S-H-02-96 and opens the commercial clam and mussel fishery in all of Subdistricts 2, 3-A, and 4 in the Southern District from January 5 through January 6.
2-S-H-04-96	January 15, 1996	Closes the 1996 commercial Tanner crab fishery in the entire Cook Inlet Management Area.
2-S-H-05-96	February 15, 1996	Supersedes e.o. No. 2-S-H-03-96 and opens the commercial clam and mussel fishery in all of Subdistricts 2, 3-A, and 4 in the Southern District from February 15 through February 16.
2-S-H-06-96	February 17, 1996	Opens the commercial clam and mussel fishery in all of Subdistricts 2, 3-A, and 4 in the Southern District, except Ismailof Island (including all intertidal beaches) from February 17 through February 18.
2-S-H-07-96	March 6, 1996	Opens the commercial clam and mussel fishery in all of Subdistricts in 2, 3-A, and 4 in the Southern District from March 6 through March 7.

2-S-H-08-96	March 8, 1996	Opens the commercial clam and mussel fishery in all of Subdistricts in 2, 3-A, and 4 in the Southern District from March 8 through March 9.
2-PU-H-01-96	April 15, 1996	Closes the personal use fishery for shrimp in waters of Kachemak bay east of a line from Anchor Point to Point Pogibshi.
2-S-H-09-96	April 17, 1996	Closes the commercial clam and mussel fishery in the southern District of the Cook Inlet Management Area. The fishery will reopen on July 1, 1996 in Subdistricts 2, 3-1A, and 4 only. Ismailof Island will remain closed for the entire regulatory year.
2-S-H-10-96	July 1, 1996	Closes the 1996-97 commercial pot shrimp fishery in Kachemak Bay.
2-S-H-11-96	July 1, 1996	Closes the 1996-97 commercial trawl shrimp fishery in Kachemak Bay.
2-S-H-12-96	August 12, 1996	Closes that portion of Sadie Cove south of 59°30 N. lat. to the commercial harvest of clams and mussels for the remainder of 1996.
2-S-H-13-96	September 1, 1996	Closes the commercial fishery for king crabs in the entire Cook Inlet Management Area.
2-S-H-14-96	August 27, 1996	Closes the commercial scallop fishery in the Kamishak District of the Cook Inlet Management Area (H) at 0800 hours.
2-S-H-15-96	September 8, 1996	Closes the commercial clam and mussel fishery in the Southern District of the Cook Inlet Management Area. The fishery will reopen on October 1, 1996 in Subdistricts 2, 3-A, and 4 only.
2-S-H-16-96	November 1, 1996	Closes the commercial clam and mussel fishery in the Southern District until ambient windchill conditions will not adversely effect the survival of sublegal and non-commercial clams that are disturbed during the clam digging process.

2-S-H-17-96	November 1, 1996	Closes commercial fishing for sea cucumbers in the described waters of Kachemak Bay, Southern District of the Cook Inlet Management Area for the remainder of the 1996-97 season.
2-S-H-18-96	November 11, 1996	Supersedes e.o. No. 2-S-H-16-96 and opens the commercial clam and mussel fishery in Subdistricts 2, 3-A, and 4 in the Southern District from November 12 through November 13.
2-S-H-19-96	November 14, 1996	Supersedes e.o. No. 2-S-H-18-96 and opens the commercial clam and mussel fishery in Subdistricts, 2 3-A, and 4 in the Southern District from November 14 through 15.
2-S-H-20-96	December 10, 1996	Supersedes e.o. No. 2-S-H-19-96 and opens the commercial clam and mussel fishery in Subdistricts, 2 3-A, and 4 in the Southern District from December 10 through 11.
2-PU-H-02-96	January 1, 1997	Closes the personal use fishery for shrimp in waters of Kachemak Bay east of a line from Anchor Point to Point Pogibshi. This fishery will be closed to all gear types including pot and trawl.

Table 2. Hardshell clam harvest (pounds) by statistical area, Cook Inlet Management Area, 1996.

	Stat.	No.	No.			Total
District	sub-area	diggers	landings	Butter	Littleneck	Hardshell
Southern	241-15 ^a	11	18	-	4,985	4,985
	241-16 ^b	24	88	233	48,539	48,772
	Total	25	102	233	53,524	53,757

^aStatistical sub-area 241-15 includes: Halibut Cove, Ismialof Island, and Peterson Bay.

^bStatistical sub-area 241-16 includes: Sadie Cove, Tutka Bay, Little Tutka, Little Jakolof Bay, Jakolof Bay, and Kasitsna Bay.

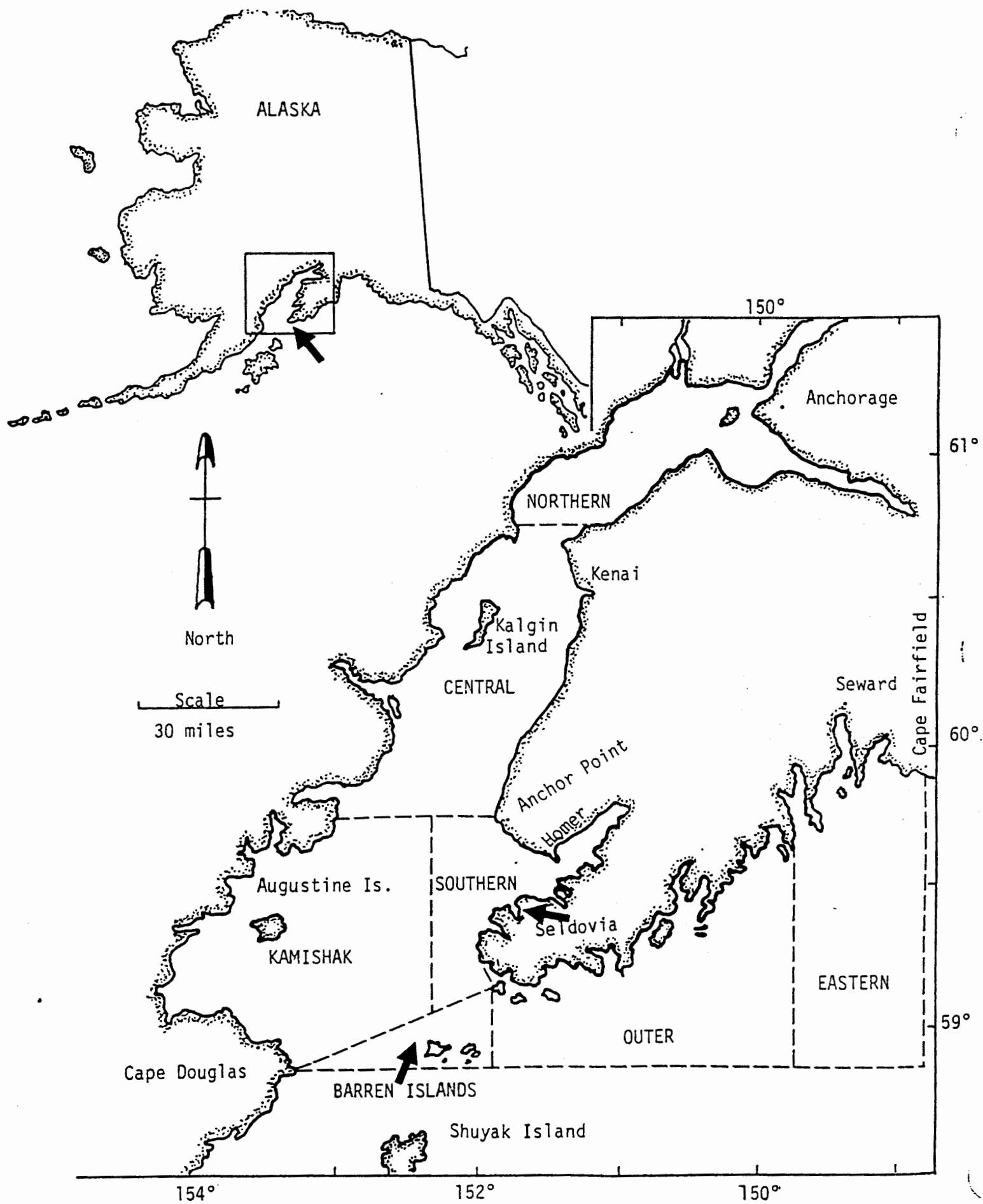


Figure 1. Cook Inlet Management Area.

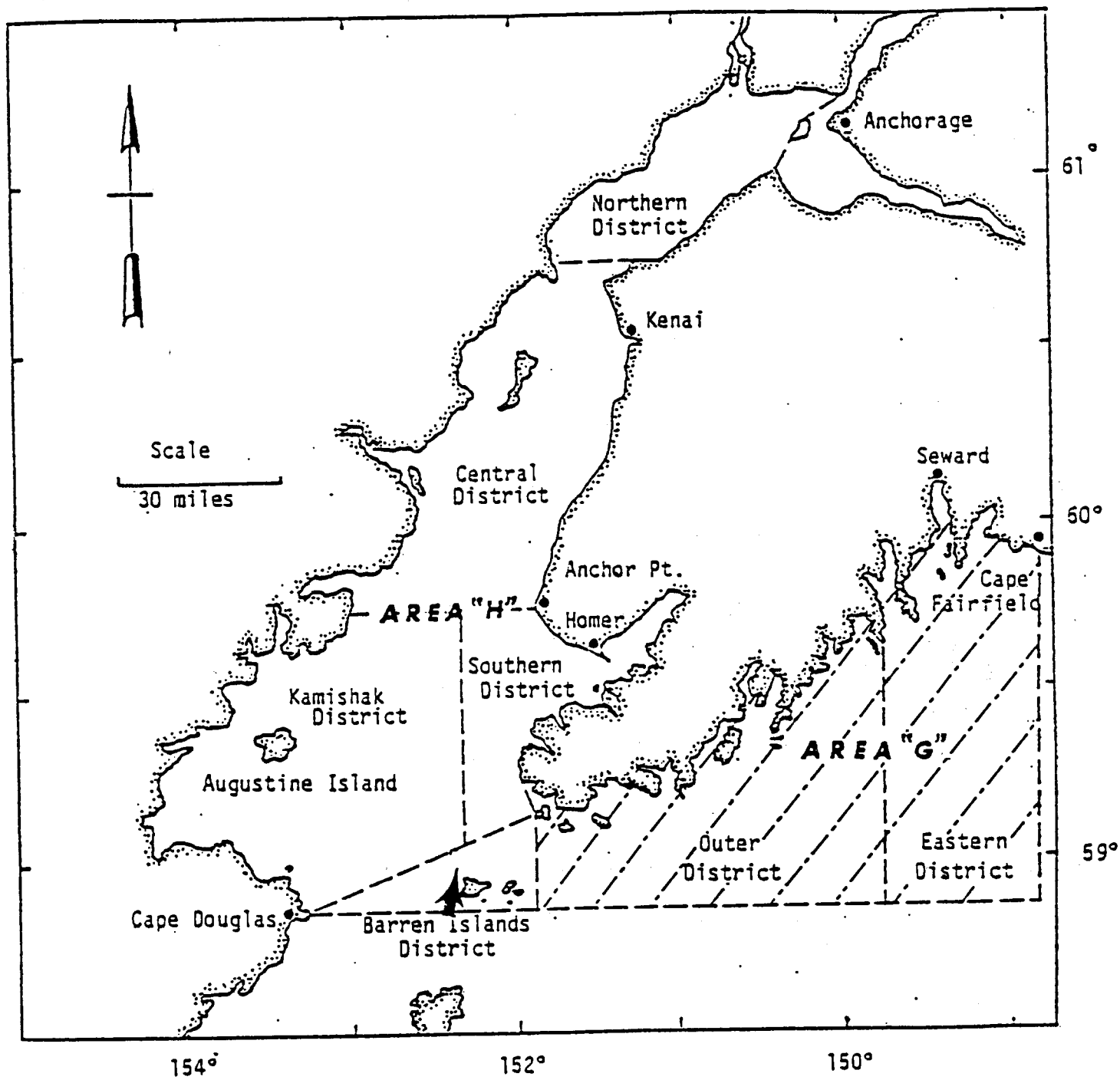


Figure 2. Cook Inlet Area ("H") and Outer Cook Inlet Area ("G") district location chart for shrimp management.

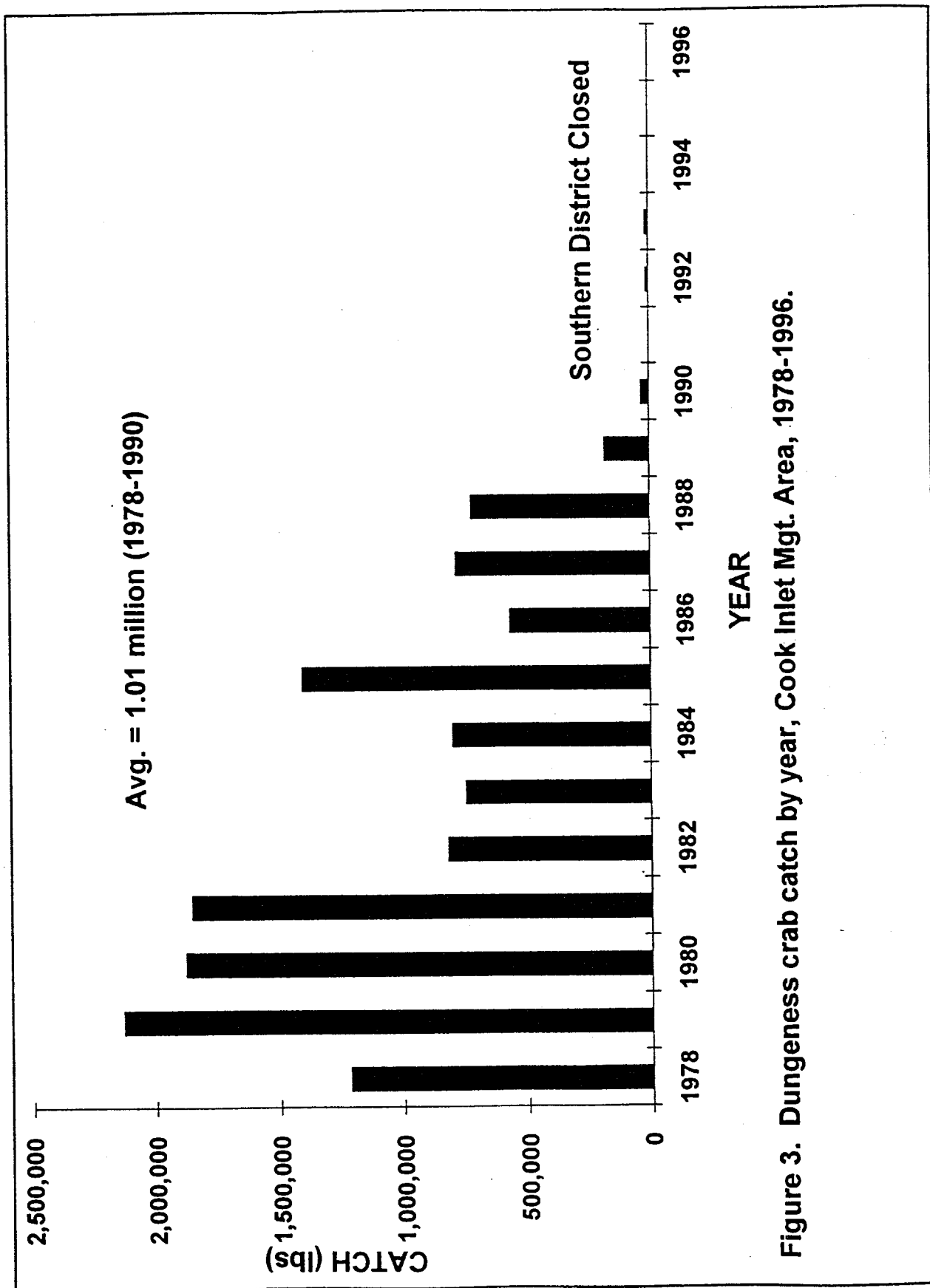


Figure 3. Dungeness crab catch by year, Cook Inlet Mgt. Area, 1978-1996.

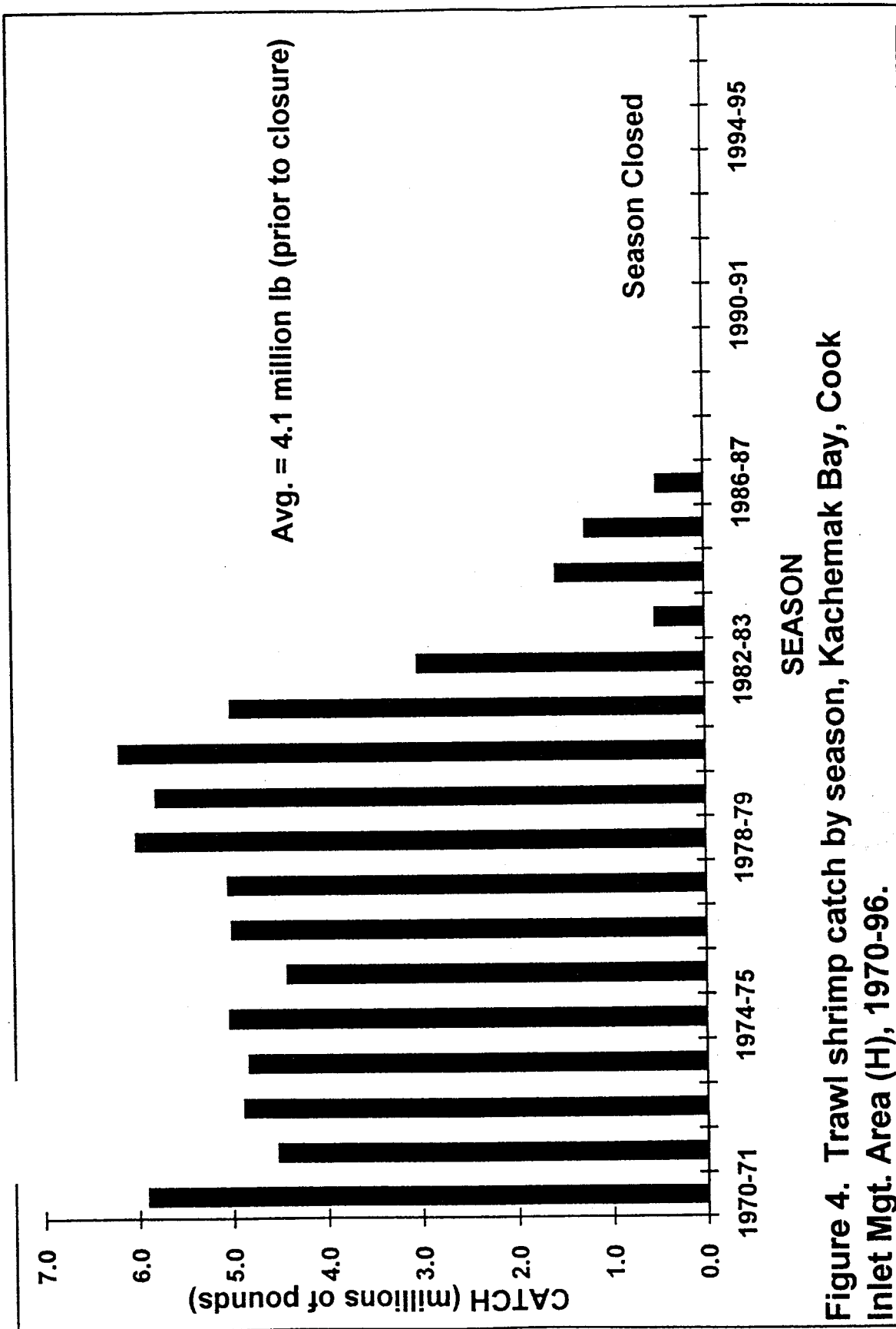


Figure 4. Trawl shrimp catch by season, Kachemak Bay, Cook Inlet Mgt. Area (H), 1970-96.

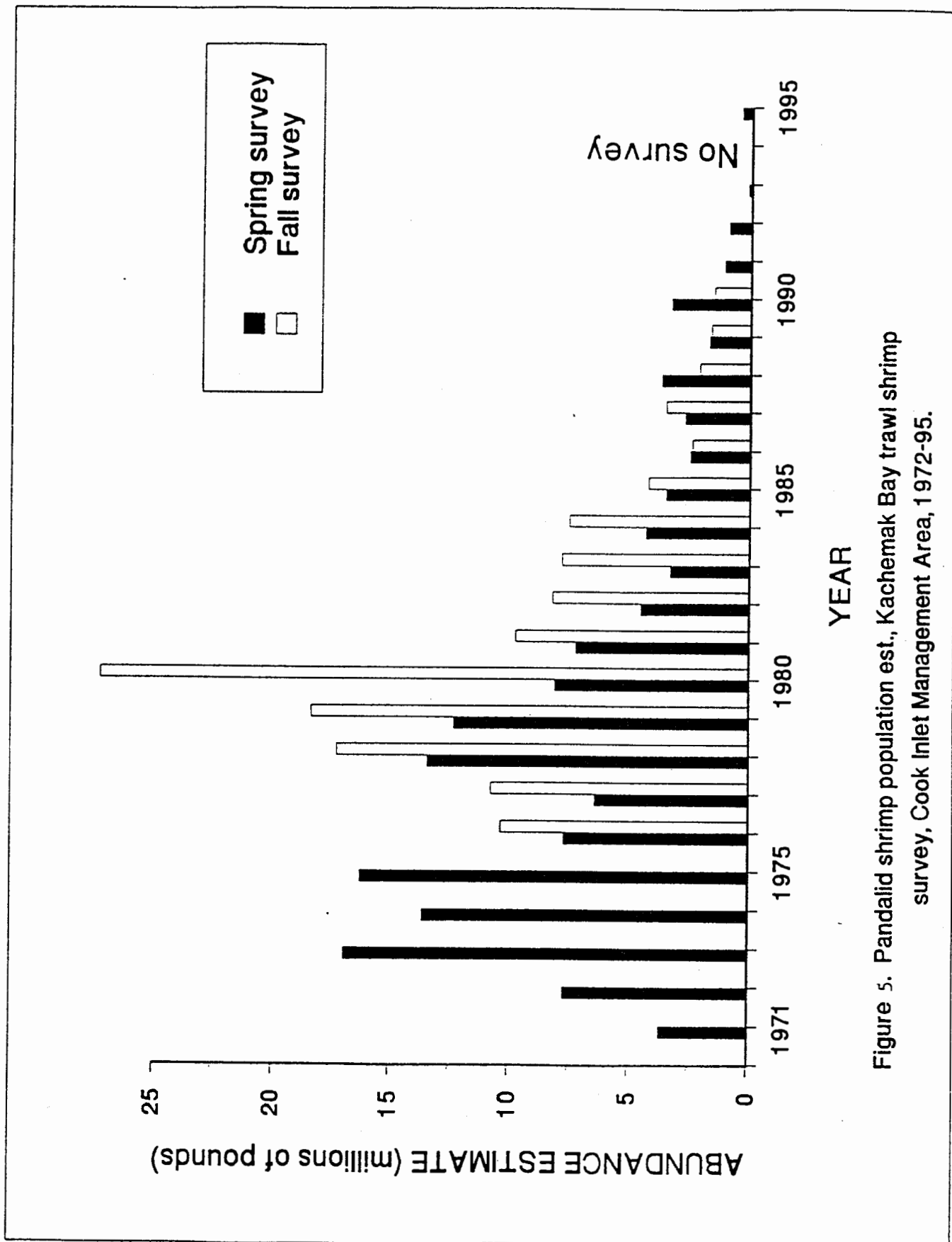


Figure 5. Pandalid shrimp population est., Kachemak Bay trawl shrimp survey, Cook Inlet Management Area, 1972-95.

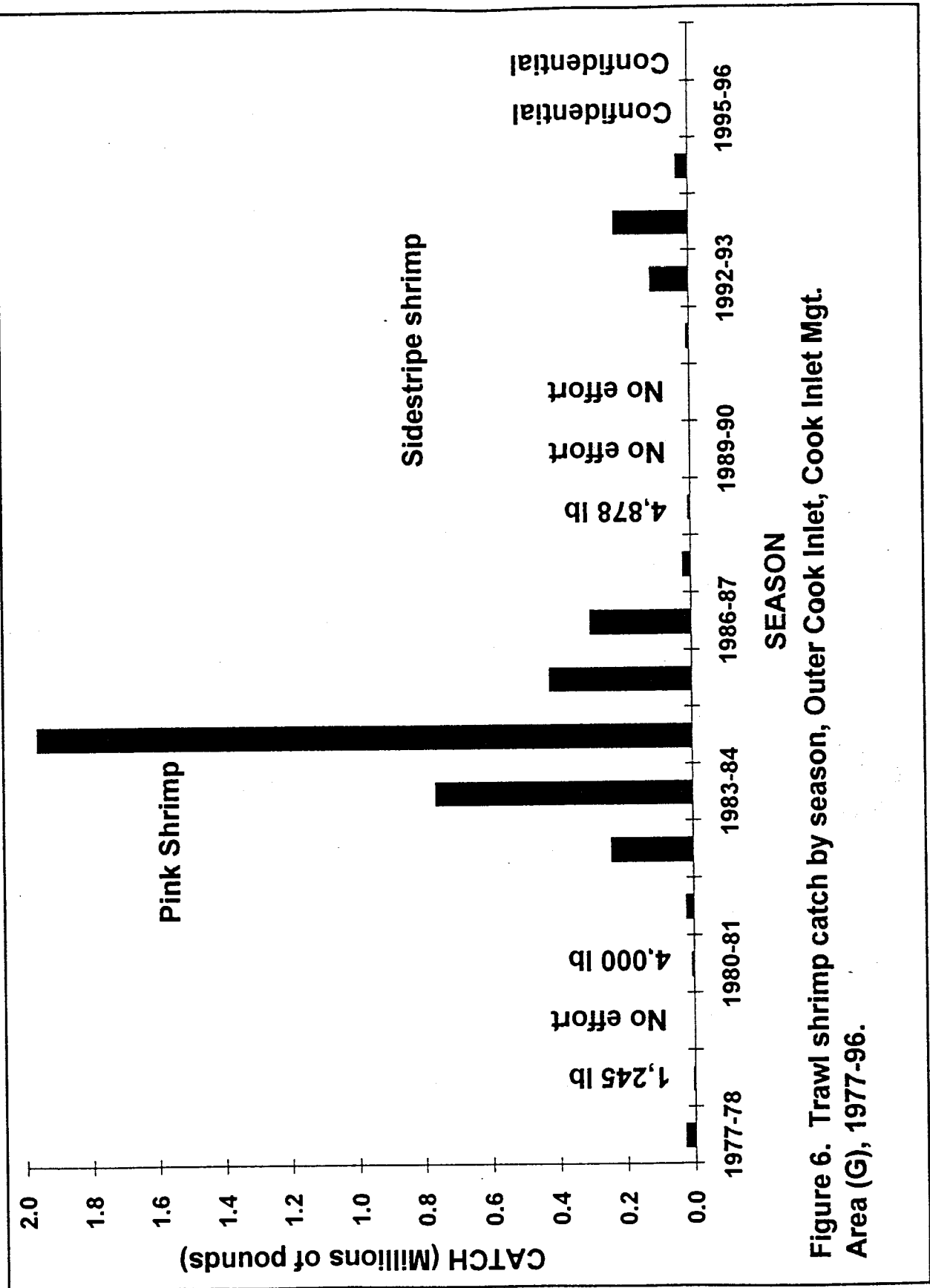


Figure 6. Trawl shrimp catch by season, Outer Cook Inlet, Cook Inlet Mgt. Area (G), 1977-96.

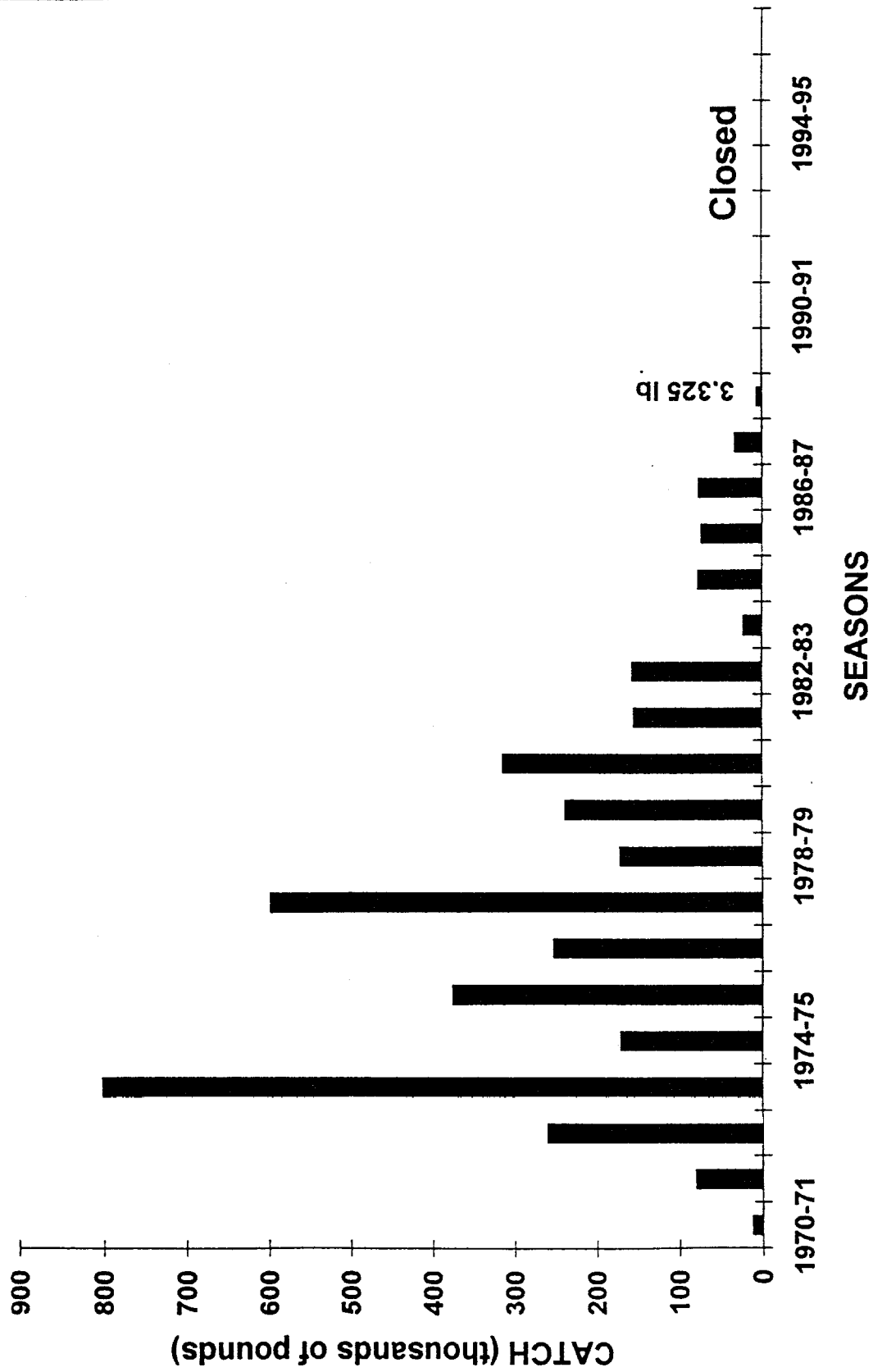


Figure 7. Pot shrimp catch by season, Kachemak Bay, Cook Inlet Mgt. Area (H), 1970-96.

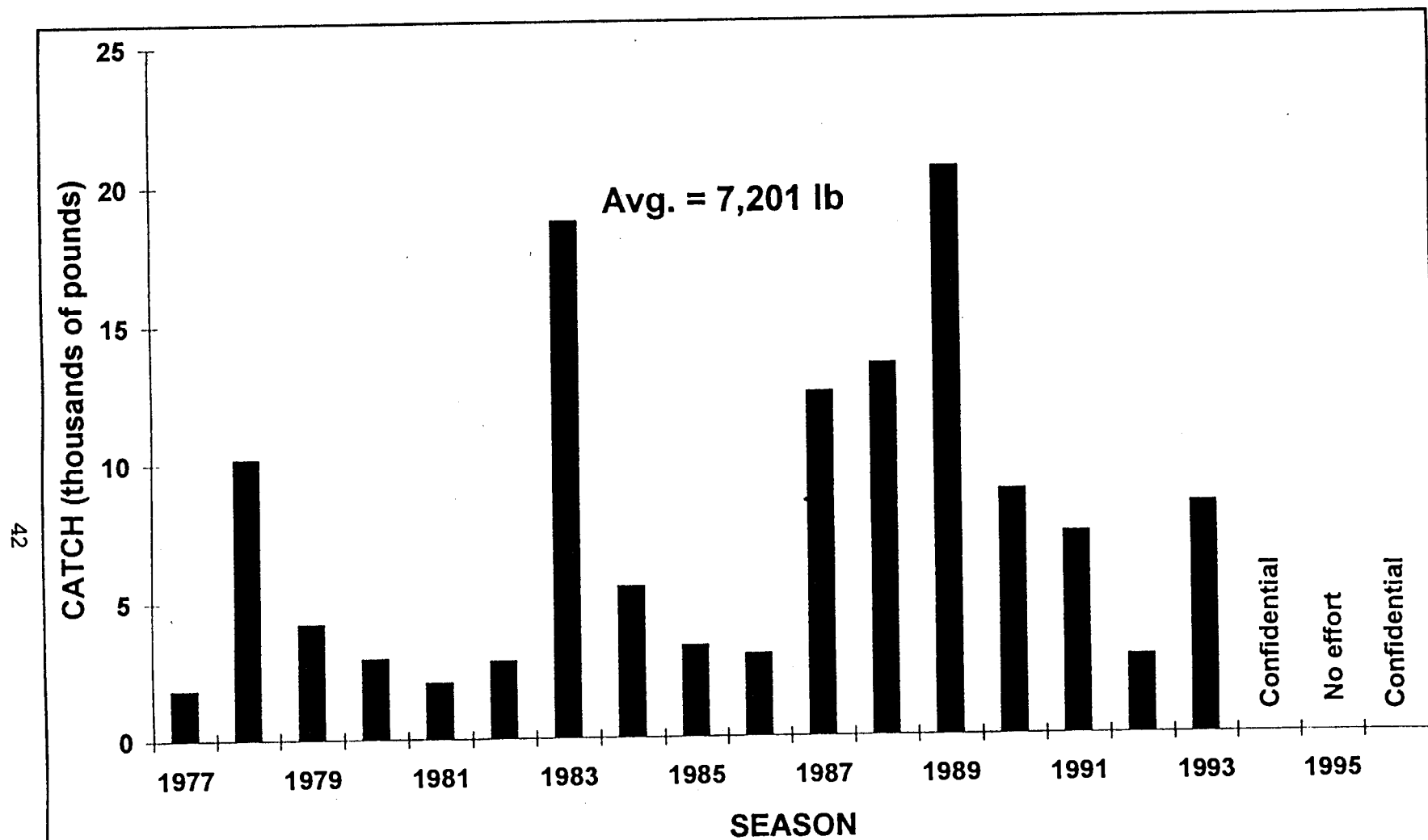


Figure 8. Pot shrimp catch by season, Outer Cook Inlet, Cook Inlet Mgt. Area (G), 1977-96.

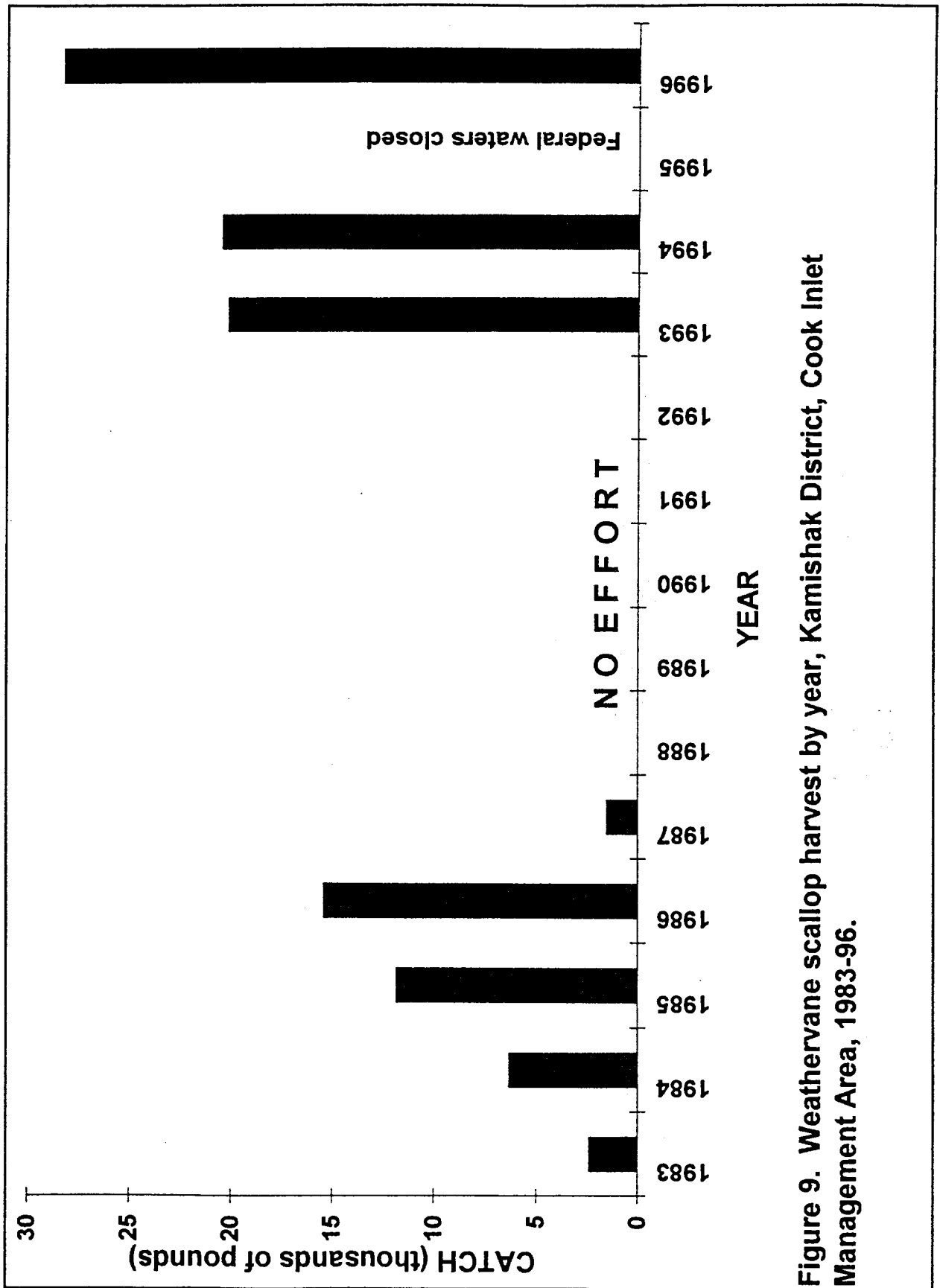


Figure 9. Weathervane scallop harvest by year, Kamishak District, Cook Inlet Management Area, 1983-96.

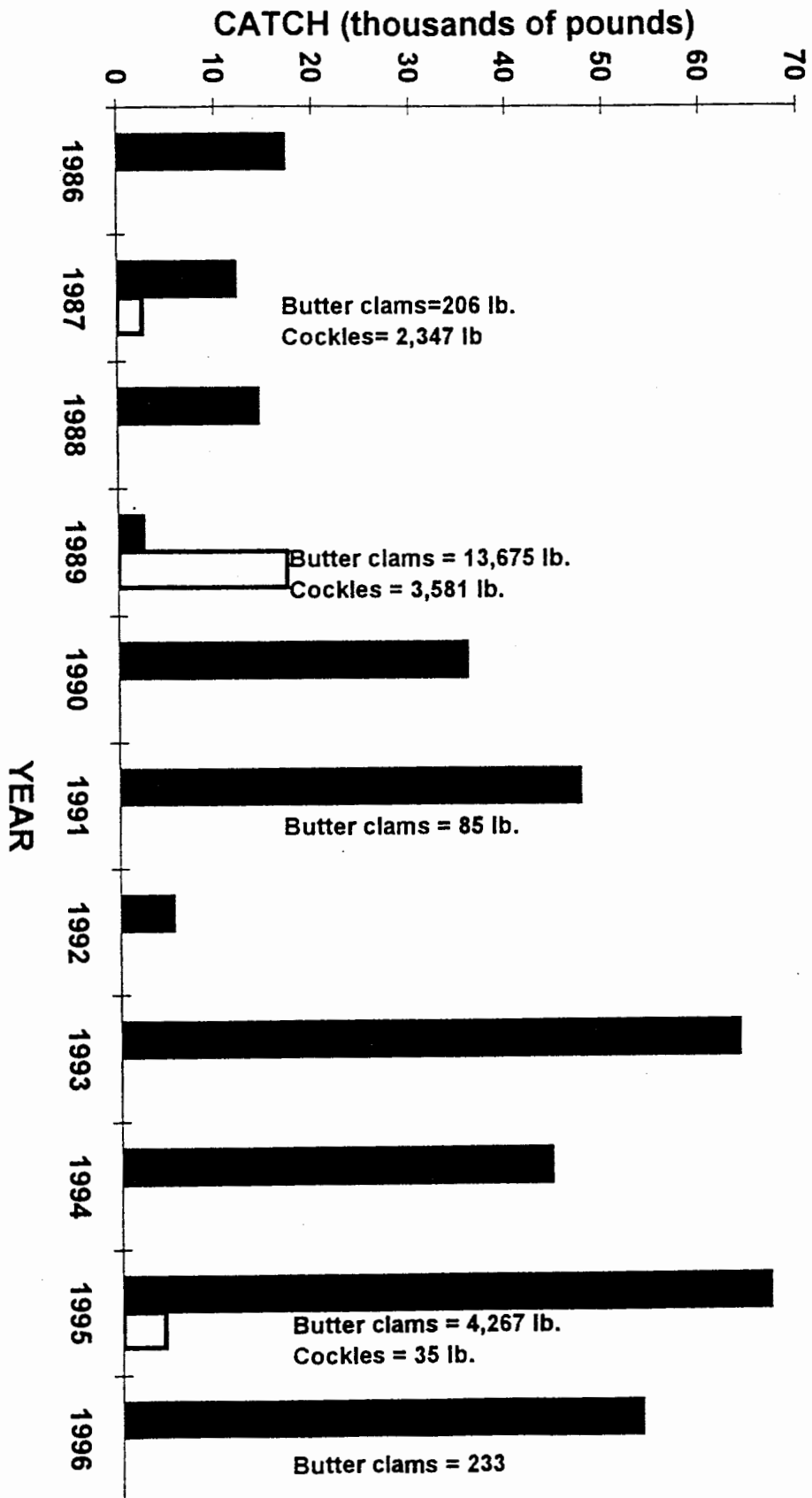


Figure 10. Hardshell clam harvest by year, Cook Inlet Management Area, 1983-96.

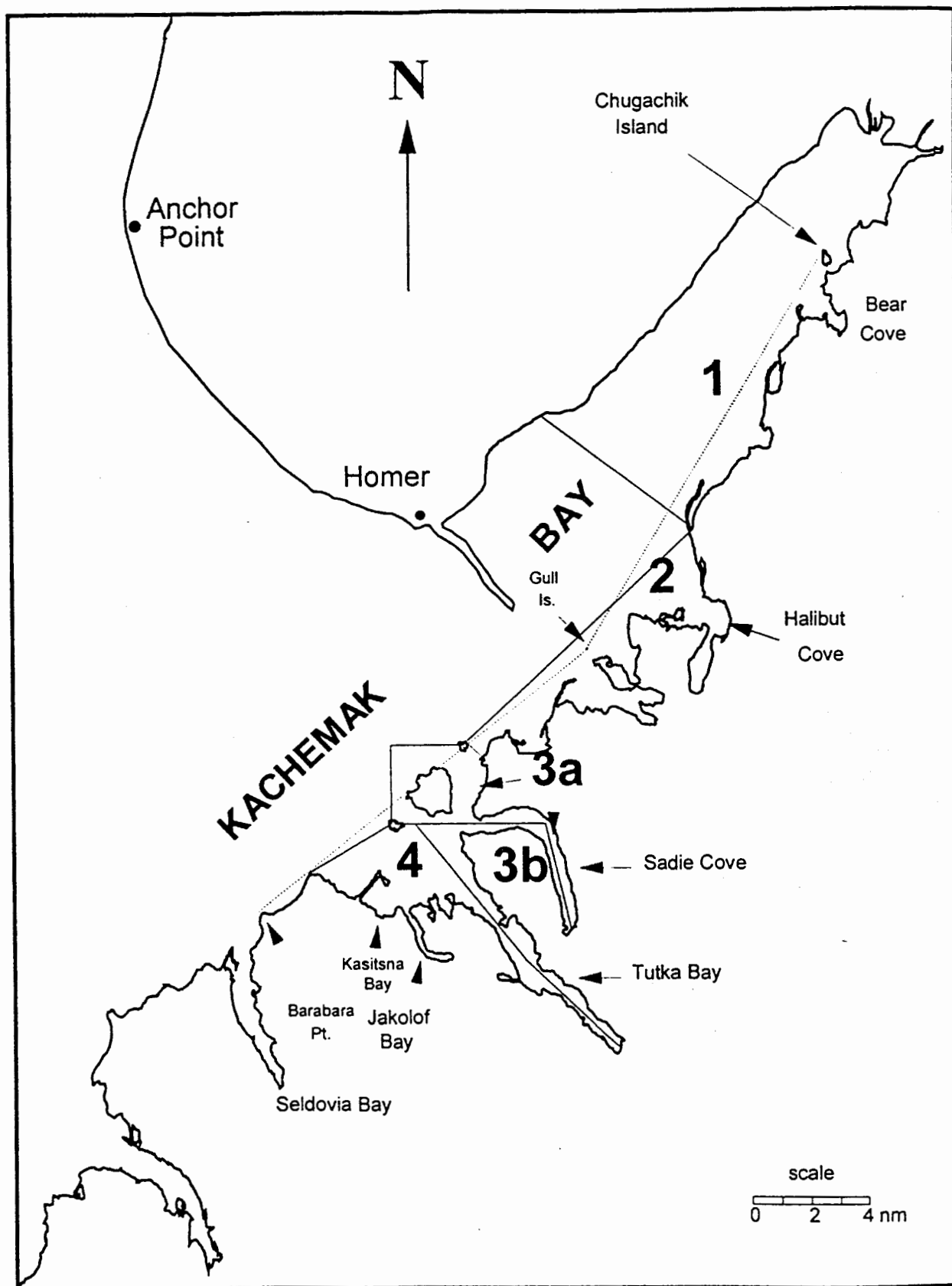


Figure 11. Southern District hardshell clam subdistricts.

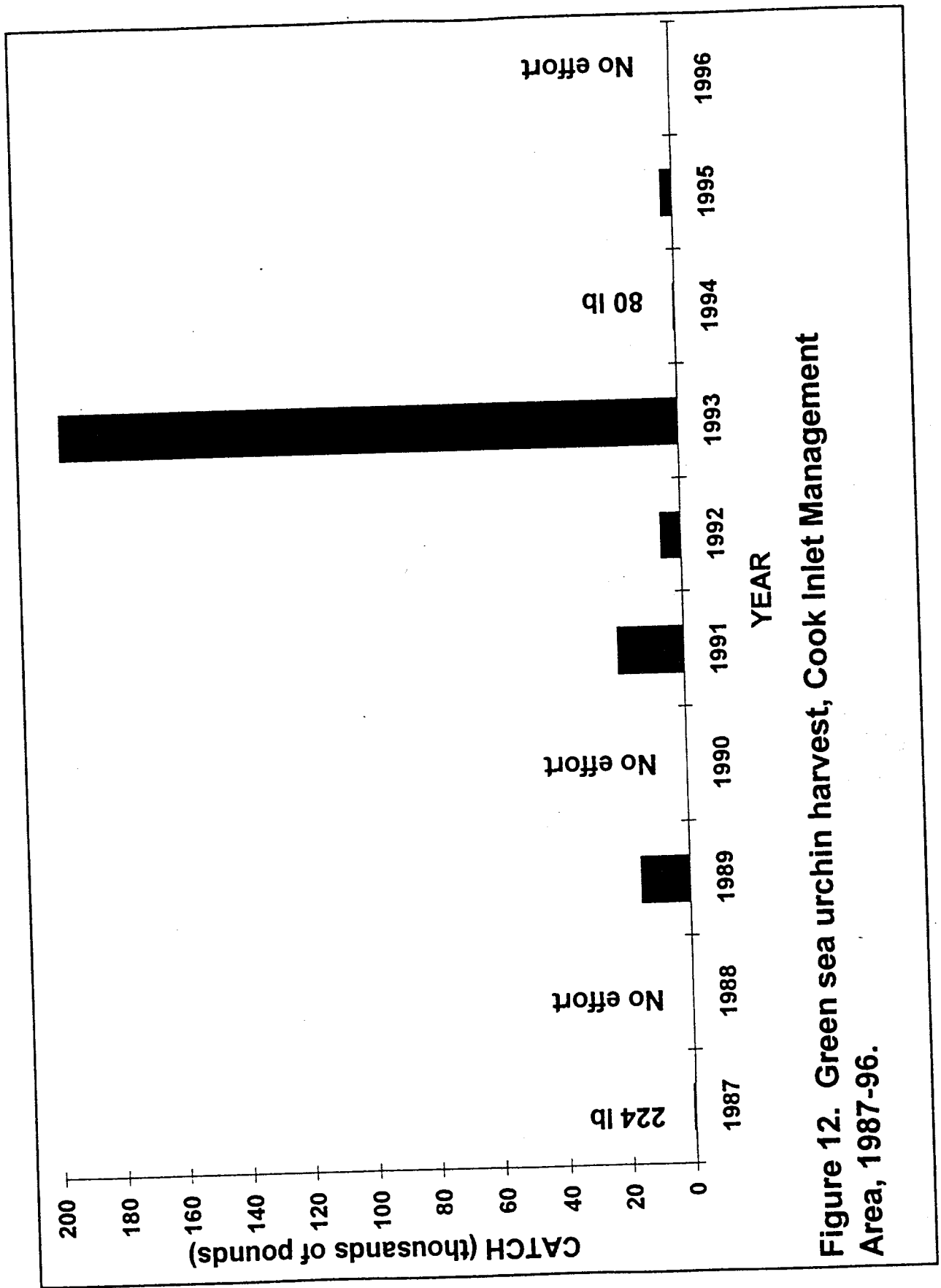


Figure 12. Green sea urchin harvest, Cook Inlet Management Area, 1987-96.

Appendix A. Dungeness crab catch (pounds) by year, Cook Inlet Management Area,
1961-1996.

Year	Southern district catch	Other districts catch	Total catch	No. of vessels	No. of landings
1961	193,683	0	193,683	12	189
1962	530,770	0	530,770	15	269
1963	1,665,599	11,605	1,677,204	50	1,360
1964	417,005	6,036	423,041	22	341
1965	74,211	0	74,211	14	105
1966	12,523	117,037	129,560	5	28
1967	7,168	0	7,168	2	13
1968	484,452	3,407	487,859	7	224
1969	49,894	0	49,894	9	41
1970	209,819	0	209,819	10	50
1971	97,161	0	97,161	22	136
1972	38,930	0	38,930	24	206
1973	308,777	1,271	310,048	54	625
1974	718,729	2,514	721,243	38	619
1975	361,893	922	362,815	34	402
1976	118,903	395	119,298	19	123
1977	74,195	510	74,705	18	94
1978	1,212,571	3,208	1,215,779	49	668
1979	2,130,963	0	2,130,963	72	1,485
1980	1,875,281	0	1,875,281	54	1,183
1981	1,850,977	0	1,850,977	88	2,047
1982	818,380	505	818,885	108	2,310
1983	746,585	834	747,419	71	1,194
1984	799,638	570	800,208	102	1,687
1985	1,389,891	12,511	1,402,402	106	1,768
1986	550,968	12,894	563,862	83	1,069
1987	761,423	21,753	783,176	100	1,377
1988	677,334	41,941	719,275	84	1,305
1989	170,266	7,798	178,064	43	455
1990	28,938	564	29,502	23	112
1991	Season closed	0	0	0	0
1992	Season closed	7,108	7,108	1	1
1993	Season closed	9,652	9,652	1	36
1994	Season closed	CONFIDENTIAL	CONFIDENTIAL		
1995 ^a	Season closed	CONFIDENTIAL	CONFIDENTIAL		
1996 ^a	Season closed	CONFIDENTIAL	CONFIDENTIAL	1	

Note: Average catch 1978-1990 = 1.01 million pounds per year.

a/ Two or less participants.

Appendix B. Dungeness commercial catch east and west of
Homer Spit, Southern District, Cook Inlet
Management Area, 1978-1996.

Year ^a	East of Spit		West of Spit	
	Catch (lbs)	Vessels	Catch (lbs)	Vessels
1978	107,470	21	1,105,101	54
1979	290,829	54	1,840,134	81
1980	375,056	44	1,500,225	61
1981	1,237,694	84	613,283	65
1982	636,789	100	181,591	71
1983	463,968	62	282,617	43
1984	563,659	82	235,979	65
1985	783,607	93	606,284	60
1986	249,183	57	301,785	34
1987	291,206	67	470,217	38
1988	426,531	55	250,803	39
1989	98,215	36	72,051	15
1990	10,495	18	18,433	10
1991		CLOSED		
1992		CLOSED		
1993		CLOSED		
1994		CLOSED		
1995		CLOSED		
1996		CLOSED		
Average	425,746	59	575,269	49

a/ 1991-96 seasons not included in average.

Appendix C. Shrimp catches (pounds) from the Kachemak Bay trawl shrimp fishery in the Cook Inlet Management Area, 1969-96.

Season	Number of vessels	Catch			Total
		Jun 1-Oct 31	Nov 1-Mar 31	Apr 1-May 31	
1969-70 ^a	7	1,289,656	1,692,854	889,330	3,871,840
1970-71 ^a	3	3,211,924	2,076,228	617,836	5,905,988
1971-72 ^a	7	2,618,630	1,761,569	140,707	4,520,906
1972-73 ^a	10	2,772,422	2,109,660		4,882,082
1973-74 ^b	13	2,502,154	2,323,780		4,825,934
1974-75	4	2,512,764	2,519,148		5,031,912
1975-76	4	1,997,563	2,421,456		4,419,019
1976-77	5	2,545,885	2,453,101		4,998,986
1977-78	7	2,490,969	2,546,977		5,037,946
1978-79	6	2,952,733	3,060,066		6,012,799
		Jul 1-Sep 30	Oct 1-Dec 31	Jan 1-Mar 31	
1979-80	7	2,013,298	2,052,646	1,731,483	5,797,427
1980-81	15	1,780,677	2,691,746	1,704,706	6,177,129
1981-82	23	1,614,868	1,686,781	1,693,850	4,995,499
1982-83	15	998,522	1,012,388	1,009,857	3,020,767
1983-84	10	CLOSED	CLOSED	525,508	525,508
1984-85	10	519,651	528,506	518,529	1,566,686
1985-86	5	488,606	257,782	503,340	1,249,728
1986-87	3	504,206	CLOSED	CLOSED	504,206
1987-88	0	CLOSED	CLOSED	CLOSED	0
1988-89	0	CLOSED	CLOSED	CLOSED	0
1989-90	0	CLOSED	CLOSED	CLOSED	0
1990-91	0	CLOSED	CLOSED	CLOSED	0
1991-92	0	CLOSED	CLOSED	CLOSED	0
1992-93	0	CLOSED	CLOSED	CLOSED	0
1993-94	0	CLOSED	CLOSED	CLOSED	0
1994-95	0	CLOSED	CLOSED	CLOSED	0
1995-96	0	CLOSED	CLOSED	CLOSED	0
1996-97	0	CLOSED	CLOSED	CLOSED	0

a Catches listed for comparative purposes by seasons established in 1973.

b June 1- October 31 and November 1 - March 31 seasons with respective guidelines established.

Appendix D. Trawl shrimp catches (pounds) in Outer Cook Inlet
(Area G), Cook Inlet Management Area, 1977-97.

Season	Number of vessels	Catch ^a
1977-78	2	26,556
1978-79	1	1,245
1979-80	0	0
1980-81	1	4,000
1981-82	2	19,454
1982-83	4	239,584
1983-84	7	760,430
1984-85	11	1,957,959
1985-86 ^b	4	421,063
1986-87	2	297,762
1987-88	1	22,231
1988-89	1	4,878
1989-90	0	0
1990-91	0	0
1991-92	2	6,196
1992-93	2	111,709
1993-94	2	218,854
1994-95	3	32,591
1995-96	1	CONFIDENTIAL
1996-97	1	CONFIDENTIAL

a Catches from 1982-1987 were predominantly pink shrimp. Catches from 1991-1996 were mostly sidestripes.

b Regulatory season of 1 June through 28 February adopted by the Alaska Board of Fisheries in spring, 1985.

Appendix E. Pot shrimp harvest (pounds) Cook Inlet Management Area, Area H, 1970-97.

Season	Number of vessels	Jun 1-Sep 30	Oct 1-May 31	Total	
1970-71		3,606	7,602	11,208	
1971-72		8,836	70,601	79,437	
1972-73		75,247	184,230	259,477	
1973-74		63,181	738,165	801,346	
1974-75		43,650	126,472	170,122	
1975-76		100,765	273,758	374,523	
1976-77	26	52,115	199,559	251,674	
1977-78	51	85,511	511,938	597,449	
1978-79	41	49,080	121,234	170,314	
1979-80	49	59,963	177,927	237,890	
		Jun 1-Sep 15	Nov 1-Dec 31	Feb 1-Mar 31	
1980-81	30	74,368	134,275	104,716	313,359
1981-82	45	56,092	47,859	49,885	153,836
1982-83	40	54,153	49,130	52,339	155,622
1983-84	15	21,438	CLOSED	CLOSED	21,438
1984-85	22	25,874	28,151	22,080	76,105
		Jun 1-Sep 15	Oct 1-Dec 31	Feb 1-Mar 31	
1985-86	25	27,312	20,737	24,048	72,097
1986-87	37	24,844	20,188	30,257	75,289
1987-88	30	26,216	5,416	CLOSED	31,632
1988-89	9	5,323	CLOSED	CLOSED	5,323
1989-90		CLOSED	CLOSED	CLOSED	0
1990-91		CLOSED	CLOSED	CLOSED	0
1991-92		CLOSED	CLOSED	CLOSED	0
1992-93		CLOSED	CLOSED	CLOSED	0
1993-94		CLOSED	CLOSED	CLOSED	0
1994-95		CLOSED	CLOSED	CLOSED	0
1995-96		CLOSED	CLOSED	CLOSED	0
1996-97		CLOSED	CLOSED	CLOSED	0

Closures have been for those waters of the Southern District east of a line from
Anchor Point to Point Pogibshi only.

Appendix F. Pot shrimp catch (pounds) and effort in Outer Cook Inlet
(Area G), Cook Inlet Management Area, 1977-96.

Season	Number of vessels	Catch
1977	6	1,776
1978	11	10,157
1979	5	4,211
1980	3	2,911
1981	5	2,031
1982	7	2,805
1983	13	18,679
1984	5	5,504
1985	6	3,305
1986	4	2,967
1987	9	12,458
1988	7	13,445
1989 ^a	8	20,500
1990	5	8,853
1991	8	7,315
1992	3	2,804
1993	3	8,356
1994	1	CONFIDENTIAL
1995	0	0
1996	2	CONFIDENTIAL

Average = 7,115

a/ Season closed from April 30 through July 7 due to Exxon Valdez
oil spill.

Appendix G. Pacific weathervane scallop catches, Cook Inlet Management Area, 1983-96.

Year	District	Number of vessels	Catch in pounds of shucked meats
1983	Kamishak	1	2,346
1984	Kamishak	3	6,305
1985 ^a	Kamishak	1	11,810
1986	Kamishak	3	15,364
1987	Outer	1	1,128
	Kamishak ^b	2	360
	'87 Total	2	1,488
1988		NO	EFFORT
1989		NO	EFFORT
1990		NO	EFFORT
1991		NO	EFFORT
1992		NO	EFFORT
1993	Kamishak	3	20,115
1994	Kamishak	4	20,431
1995 ^c	Kamishak	0	0
1996	Kamishak	5	28,228

a/ Season and harvest guideline set by regulation.

b/ Season closed by E.O. on August 21, 1987, one week after opening,
due to low cpue.

c/ State waters open only.

Appendix H. Harvest (pounds) of hardshell clams, Cook Inlet Management Area, 1986-96.

Year	No. of permits	No. of landings	Pacific little necks	Butter clams	Cockles	Total	Sport Harvest Hardshell Clams.
1986	5	18	17,303	0	0	17,303	171,800
1987	8	69	12,214	206	2,347	14,767	137,100
1988	2	32	14,449	0	0	14,449	214,310
1989	9	41	2,584	13,675 ^a	3,581 ^b	19,840	128,940
1990	19	62	35,744	0	0	35,744	87,280
1991	19	78	47,486	85	0	47,571	89,050
1992	21	117	54,631	0	0	54,631	89,210
1993	33	159	63,676	0	0	63,676	70,980
1994	32	104	44,291	0	0	44,291	112,480
1995	21	93	66,723	4,267	35	71,025	168,230
1996	25	102	53,524	233	0	53,757	

^a Includes 13,348 pounds sold as otter food as a result of Exxon Valdez oil spill.

^b Includes 1,981 pounds sold as otter food as a result of Exxon Valdez oil spill.

Appendix I. Harvest (pounds) of blue mussels, Cook Inlet Management Area, 1986-96.

Year	No. of permits	No. of landings	Total
1986	0	0	0
1987	1	2	102
1988	0	0	0
1989	9	98	167,243 ^a
1990	2	10	10,600
1991	3	11	16,485
1992	3	11	2,501
1993	2	4	1,083
1994	2	3	570
1995	1		CONFIDENTIAL
1996	3	7	2,450

^a Includes 165,268 pounds sold as otter food as a result of Exxon Valdez oil spill.

Appendix J. Green sea urchin harvest (pounds), Cook Inlet Management Area, 1987-96.

Year	No. of divers	Total
1987	1	224
1988	NO EFFORT	
1989	1	15,181
1990	NO EFFORT	
1991	4	20,445
1992	7	6,119
1993	29	195,403
1994	2	80
1995	9	3,295
1996	0	0

Appendix K. Sea cucumber catch (pounds) by permit season, Cook Inlet
Management Area, 1990-97.

Permit season	No. divers	No. landings	Total
1990	2	14	22,525
1991		N O C A T C H ^b	
1992		N O C A T C H ^b	
1993-94 ^a	16	40	30,940
1994-95 ^a	22	93	26,575
1995-96		N O C A T C H ^b	
1996-97	3	6	1,528

a/ Permit season established 10/1 - 4/30.

b/ Divers did not find commercial quantities of sea cucumbers.

Appendix L. Octopus harvest (pounds) in the Cook Inlet Management Area (H) 1983-96.

Year	No. of vessels	No. of landings	Total
1983	41	101	32,841 ^a
1984	36	77	46,698 ^a
1985	40	70	48,067 ^a
1986	8	16	435
1987	21	57	4,512
1988	17	43	5,569
1989		NO REPORTED LANDINGS	
1990	3	6	1,343
1991	8	21	2,088
1992		NO DIRECTED FISHERY	
1993 ^b	3	6	475
1994 ^b	3	9	1,064
1995 ^b	6	12	1,594
1996 ^b	3	10	2,215

a/ Bycatch from shellfish pot fisheries.

b/ Directed fishery catch and effort only.

Appendix M. Harvest (pounds) of blue mussels, Cook Inlet Management
Area, 1986-96.

Year	No. of permits	No. of landings	Total
1986	0	0	0
1987	1	2	102
1988	0	0	0
1989	9	98	167,243 ^a
1990	2	10	10,600
1991	3	11	16,485
1992	3	11	2,501
1993	2	4	1,083
1994	2	3	570
1995	1	CONFIDENTIAL	
1996	3	7	2,450

^a Includes 165,268 pounds sold as otter food as a result of
Exxon Valdez oil spill.

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